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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/940,475	08/29/2001	Hideki Sawaguchi	ASAM.0019	4883

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EXAMINER	
RODRIGUEZ, GLENDA P	
ART UNIT	PAPER NUMBER
2627	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/15/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	09/940,475	SAWAGUCHI ET AL.	
	Examiner	Art Unit	
	Glenda P. Rodriguez	2627	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 November 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24, 27-46* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *27-42* is/are allowed.

6)☒ Claim(s) *1,6-12,17-26 and 43-46* is/are rejected.

7)☒ Claim(s) *2-5 and 13-15* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 6-9, 12, 17-20 and 43-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ziperovich (US Patent No. 5, 459, 679) in view of Mallary (US Patent No. 6, 359, 744).

Regarding Claim 1, Ziperovich teaches a magnetic recording/reproducing apparatus comprising a medium and a reproducing head constituted by a magneto resistive effect type head with a shield film (Elements 12 and 10),

> Wherein a reproduced signal outputted from said reproducing head is processed through a partial response equalization circuit (Col. 5, L. 21-27, wherein Ziperovich teaches a PRML channel) having a frequency characteristic so that a low-frequency component of said reproduced signal including a direct current component is passed and suppressed through said partial response equalization circuit (See Col. 8, under DC Offset Control Loop, wherein Ziperovich teaches how the PRML channel cancels the Offset of the signal. It is obvious that because the DC offset is found at frequency value 0, when the DC offset is eliminated, the low frequencies are also diminished or eliminated when eliminating the DC offset.);

And wherein said reproduced signal is supplied to a maximum-likelihood decoder so as to be data-reproduced (Col. 1, L. 50-65, wherein it describes that PRML channels contain ML of Maximum Likelihood detectors.).

However, Ziperovich does not explicitly teach that the medium is a dual layer perpendicular medium and it has a soft underlayer. Mallary teaches a perpendicular dual layer medium with a soft underlayer in Elements 30, 115 and 120. It would have been obvious to a person of ordinary skill in the art, at the time the invention was made, to modify Ziperovich's invention with the teaching of Mallary in order to increase data storage capacity as taught by Mallary in the Summary of the invention.

Claim 12 has limitations similar to those treated in the above rejection, and is met by the references as discussed above.

Regarding Claims 6 and 17, the combination of Ziperovich and Mallary teach all the limitations of Claims 1 and 12, respectively. The combination further teach wherein comprising a plurality of partial response equalization circuits having different direct current frequency component passing characteristics respectively or a plurality of partial response equalization circuits defined by different values of parameter a respectively, wherein a reproduced signal from said reproducing head is supplied to said plurality of partial response equalization circuits so as to be waveform-equalized in said partial response equalization circuits (Col. 6, L. 2-14 of Ziperovich).

Regarding Claims 7 and 18, the combination of Ziperovich and Mallary teach all the limitations of Claims 1 and 12, respectively. The combination further teach one of different direct current frequency component passing characteristics or one of different values of

parameter a is selected and set in said partial response equalization circuit, and wherein said reproduced signal from said reproducing head is supplied to said partial response equalization circuit so as to be waveform-equalized (Col. 6, L. 2-14 of Ziperovich).

Regarding Claims 8, 19, 43 and 45, the combination of Ziperovich and Mallary teach all the limitations of Claims 6, 17, 18 and 7, respectively. The combination further teach wherein at least one of said different direct current frequency component passing characteristics is a cut-off characteristic of a direct current frequency component, or at least one of different values of said parameter α satisfies a condition of $\alpha=1$ (Col. 12, L. 56-63 of Ziperovich).

Regarding Claims 9, 20, 44, 46, the combination of Ziperovich and Mallary teach all the limitations of Claims 8, 19, 43 and 45, respectively. The combination further teach wherein a signal for adjusting or controlling a circuit disposed in a pre-stage of said partial response equalization circuit is referred to from a circuit in a post-stage of said partial response equalization circuit having said cut-off characteristic of said DC frequency component, or from a circuit in a post-stage of said response equalization circuit having said parameter a satisfying $\alpha=1$ (Col. 8, under "DC Offset Control Loop", wherein Ziperovich teaches the post stage equalization of the signal in order to eliminate the offset. See also Col. 12, L. 56-63 of Ziperovich).

3. Claims 10, 11, 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Ziperovich and Mallary as applied to claim 1 above, and further in view of Hull et al. (US Patent No. 6, 262, 857).

Regarding Claims 10 and 21, the combination of Ziperovich and Mallary teach all the limitations of Claims 1 and 12, respectively. However, the combination does not explicitly teach wherein an information data bit sequence to be recorded is converted into a data bit sequence so

that a maximum number m of consecutive recording transitions recorded at a shortest bit length interval on said recording medium is limited to a finite value; and then said converted data bit sequence is recorded on said recording medium. This limitation is taught by Hull et al., wherein its Gray code (which is a finite amount of data) is written in the shortest bit length as taught in Col. 35, L. 1-7. It would have been obvious to a person of ordinary skill in the art, at the time the invention was made, to modify the combination's invention with the teaching of Hull et al. in order to detect its position in a disk as taught in Col. 34, L. 61-65.

Regarding Claims 11 and 22, the combination of Ziperovich, Mallary and Hull et al. teach all the limitations of Claims 10 and 21, respectively. The combination further teach wherein the transitions cannot be larger than 4 (Col. 34, L. 61-65. It is obvious that the Gray code can be adjusted to a finite amount of bits.).

4. Claims 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Ziperovich and Mallary as applied to claim 12 above, and further in view of Kikuta (US Patent No. 6, 377, 416).

Regarding Claim 23, the combination of Ziperovich and Mallary teach all the limitations of Claim 12. However, the combination does not explicitly teach wherein a semiconductor integrated circuit. This is taught by Kikuta in Col. 1, L. 9-16. It would have been obvious to a person of ordinary skill in the art, at the time the invention was made, to modify the combination's invention with the teaching of Kikuta in order to have faster reading/writing speeds as taught by Kikuta in the Background of the Invention.

Regarding Claim 24, the combination of Ziperovich, Mallary and Kikuta teach all the limitations of Claim 23. The combination further teach wherein a semiconductor is mounted thereon (See Col. 1, L. 9-16 of Kikuta).

Allowable Subject Matter

5. Claims 2-5, 13-16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The reasons for allowable subject matter were cited in the previous Office Action.

6. Claims 27-42 are allowed.

The reasons for allowance were cited in the previous Office Action.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

7. Applicant's arguments filed 11/30/06 have been fully considered but they are not persuasive. Applicant argues that contrary to Ziperovich which was the reference used by the Examiner, the present application is a "...structure that passes and suppresses the DC component. This distinction means the DC component is attenuated and appropriately controlled- not made zero as in Ziperovich". Examiner cannot concur with the Applicant due that according to Webster's Dictionary, the verb suppress under the definition number 5

(Electronics, Radio, etc) means 'to eliminate or weaken'. Therefore, the cited reference Ziperovich according to the definition, is in fact suppressing the DC component. Therefore, the USC 103 under the combination of Ziperovich and Mallary stands.

8. Examiner acknowledges that Claims 25 and 26 have been canceled.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Glenda P. Rodriguez whose telephone number is (571) 272-7561. The examiner can normally be reached on Monday thru Thursday: 7:00-5:00; alternate Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrea L. Wellington can be reached on (571) 272-4483. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

gpr
02/07/07

ANDREA WELLINGTON
SUPERVISORY PATENT EXAMINER